

**Summary of Test Results**

Reference no. : DP-SUMMARY-2016-23

Customer : Gate Way Valves &amp; Fitting Ltd.

Address : Flat A1, 4/F., Galaxy Factory Building, 25-27 Luk Hop Street, San Po Kong, Kowloon, H. K.

Sample description : Bronze Y-pattern Strainers with Thread Ends

Brand : Toyo

Manufacturer : Kitz (Thailand) Ltd.

Origin : Thailand

Sample submitted by : Gate Way Valves &amp; Fitting Ltd.

Test standard : BS EN 12266-1 : 2012

Test period : 10 March to 10 May 2016

**A) Sample list**

| Model no.    | DN | Inch   | Specimen no.  |
|--------------|----|--------|---------------|
| Fig. No. 380 | 15 | 1/2"   | DP0160218-139 |
|              | 20 | 3/4"   | DP0160218-140 |
|              | 25 | 1"     | DP0160218-141 |
|              | 32 | 1-1/4" | DP0160218-142 |
|              | 40 | 1-1/2" | DP0160218-143 |
|              | 50 | 2"     | DP0160218-144 |

**B) Test Item****1) Dimensions check (In-house method based on manufacturer requirement)**

| DN | Inch   | Test results | Castco LRN        |
|----|--------|--------------|-------------------|
| 15 | 1/2"   | Passed       | DP0160218-138 DIM |
| 20 | 3/4"   | Passed       |                   |
| 25 | 1"     | Passed       |                   |
| 32 | 1-1/4" | Passed       |                   |
| 40 | 1-1/2" | Passed       |                   |
| 50 | 2"     | Passed       |                   |

## Summary of Test Results

Reference no. : DP-SUMMARY-2016-23

## B) Test Item (con't)

## 2) Hydrostatic strength test (BS EN 12266-1 : 2012 Clause 4 Annex A)

| DN | Inch   | Test results | Castco LRN        |
|----|--------|--------------|-------------------|
| 15 | 1/2"   | Passed       | DP0160218-138 HYD |
| 20 | 3/4"   | Passed       |                   |
| 25 | 1"     | Passed       |                   |
| 32 | 1-1/4" | Passed       |                   |
| 40 | 1-1/2" | Passed       |                   |
| 50 | 2"     | Passed       |                   |

## 3) Chemical Composition (BS EN 1982 : 2008, Table 23b, Grade CC491K / BS EN 10088-1 : 2014, Grade 1.4301 (304))

| DN | Inch   | Parts of valve | Test results | Castco LRN   |
|----|--------|----------------|--------------|--------------|
| 15 | 1/2"   | Body           | Passed       | MS0160421-31 |
|    |        | Screen         | Passed       | MS0160421-32 |
| 32 | 1-1/4" | Body           | Passed       | MS0160421-33 |
|    |        | Screen         | Passed       | MS0160421-34 |
| 50 | 2"     | Body           | Passed       | MS0160421-35 |
|    |        | Screen         | Passed       | MS0160421-36 |

Prepared by : \_\_\_\_\_  
Date : 04 June 2016


**FU HO MAN**  
Assistant Technical Officer

Review by : \_\_\_\_\_  
Date : 04 June 2016


**WONG KA MAN**  
Laboratory Manager

Test Report  
Dimensions Check of Y-strainers  
(In-house method)

Date of issue : 22 April 2016

Page 1 of 9 page(s)

Castco LRN : DP0160218-138 DIM

**Details as supplied by customer**

Customer : Gate Way Valve &amp; Fitting Ltd.

Customer's ref. no. : - -

Address : Flat A1, 4/F., Galaxy Factory Building, 25 Luk Hop Street, San Po Kong, H. K.

Contract no. : - -

Job title : - -

Sample description : Bronze Y-pattern Strainers with Thread Ends

Nominal pressure (PN) : 20

Manufacturer : Kitz (Thailand) Ltd.

Brand name : Toyo

Body marking : TOYO

Model no. : Fig. No. 380

Origin : Thailand

Sample submitted by : Gate Way Valve &amp; Fitting Ltd.

**Laboratory test results**

Date of sample received : 18 February 2016

Date of test : 20 April 2016

| Specimen no. |                          | DP0160218-139 | DP0160218-140 | DP0160218-141 | DP0160218-142 | DP0160218-143 | DP0160218-144 |
|--------------|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| DN           |                          | 15            | 20            | 25            | 32            | 40            | 50            |
| Inch         |                          | 1/2"          | 3/4"          | 1"            | 1-1/4"        | 1-1/2"        | 2"            |
| H (mm)       | Measured Mean Value      | 51            | 61            | 73            | 82            | 95            | 121           |
|              | Manufacturer requirement | 51            | 62            | 74            | 82            | 94            | 121           |
| L (mm)       | Measured Mean Value      | 80            | 100           | 114           | 135           | 160           | 194           |
|              | Manufacturer requirement | 80            | 100           | 115           | 135           | 160           | 195           |
| LI (mm)      | Measured Mean Value      | 59            | 72            | 86            | 99            | 112           | 146           |
|              | Manufacturer requirement | 60            | 73            | 86            | 99            | 112           | 145           |

Remark(s) :

1. Test results relate only to the specimen tested.

Checked by :  **FU HO MAN**  
Assistant Technical OfficerCertified by :  **WONG KA MAN**  
Laboratory Manager

Test Report  
Hydrostatic Strength Test of Y-strainers  
(BS EN 12266-1 : 2012 Clause 4 Annex A)

Date of issue : 22 April 2016  
Page 2 of 9 page(s)

Castco LRN : DP0160218-138 HYD

Details as supplied by customer

Customer : Gate Way Valve & Fitting Ltd.  
Address : Flat A1, 4/F., Galaxy Factory Building, 25 Luk Hop Street, San Po Kong, H. K.  
Job title : - -

Customer's ref. no. : - -  
Contract no. : - -

Sample description : Bronze Y-pattern Strainers with Thread Ends  
Nominal pressure (PN) : 20  
Manufacturer : Kitz (Thailand) Ltd.  
Brand name : Toyo  
Body marking : TOYO  
Model no. : Fig. No. 380  
Origin : Thailand  
Sample submitted by : Gate Way Valve & Fitting Ltd.

Laboratory test results

Date of sample received : 18 February 2016

Date of test : 10 March 2016

A. Shell Tightness (BS EN 12266-1 : 2012 Annex A.3)

| Specimen no.  | DN | Apply pressure (bar) | Test duration (s) | Visually detectable leakage | Test results | Requirement                                  |
|---------------|----|----------------------|-------------------|-----------------------------|--------------|----------------------------------------------|
| DP0160218-139 | 15 | 30                   | 60                | No                          | Passed       | Visually detectable leakage is not permitted |
| DP0160218-140 | 20 | 30                   | 60                | No                          | Passed       |                                              |
| DP0160218-141 | 25 | 30                   | 60                | No                          | Passed       |                                              |
| DP0160218-142 | 32 | 30                   | 60                | No                          | Passed       |                                              |
| DP0160218-143 | 40 | 30                   | 60                | No                          | Passed       |                                              |
| DP0160218-144 | 50 | 30                   | 60                | No                          | Passed       |                                              |

Remark(s) :

1. Test results relate only to the specimen tested.
2. Test results of sample comply with the requirement of BS EN 12266-1 : 2012 Clause 4 Annex A.

Checked by : **FU HO MAN**  
Assistant Technical Officer

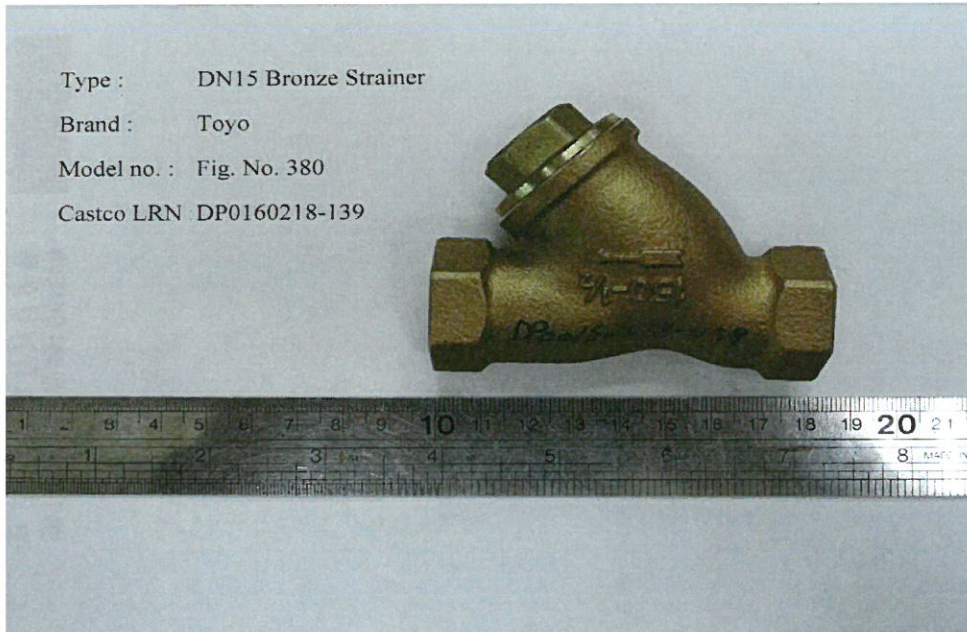
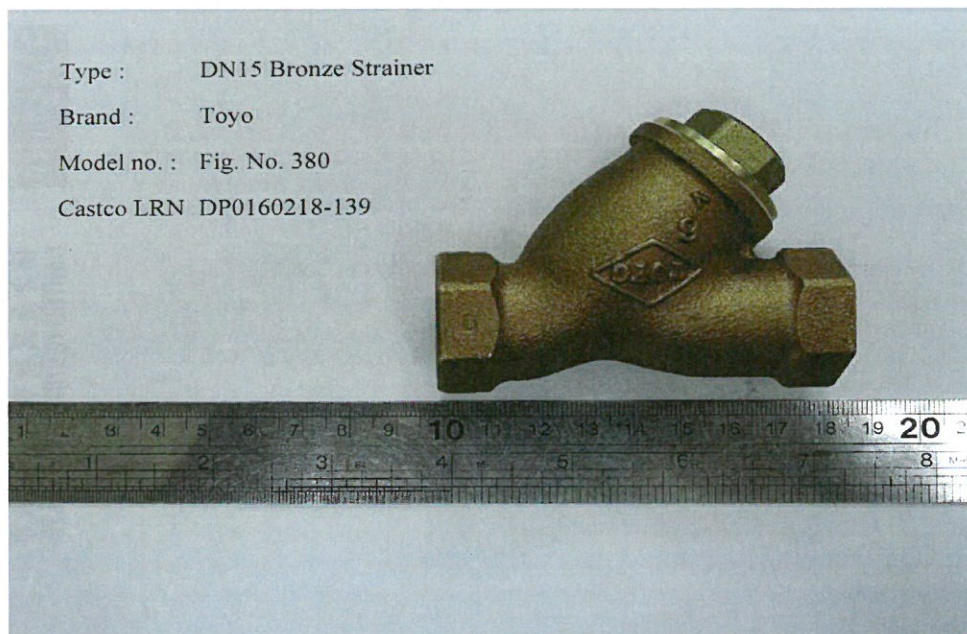
Certified by : **WONG KA MAN**  
Laboratory Manager

Test Report  
Dimensions Check of Y-strainers  
(In-house method)

Date of issue : 22 April 2016

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Castco LRN : DP0160218-138 DIM

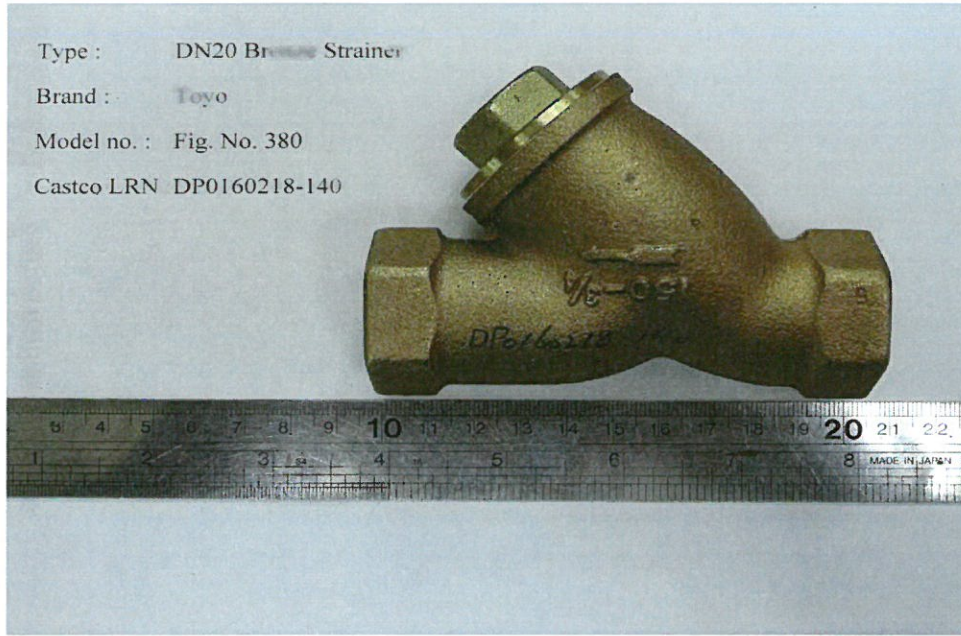
Appendix ADP0160218-139(1)DP0160218-139(2)

Test Report  
Dimensions Check of Y-strainers  
(In-house method)

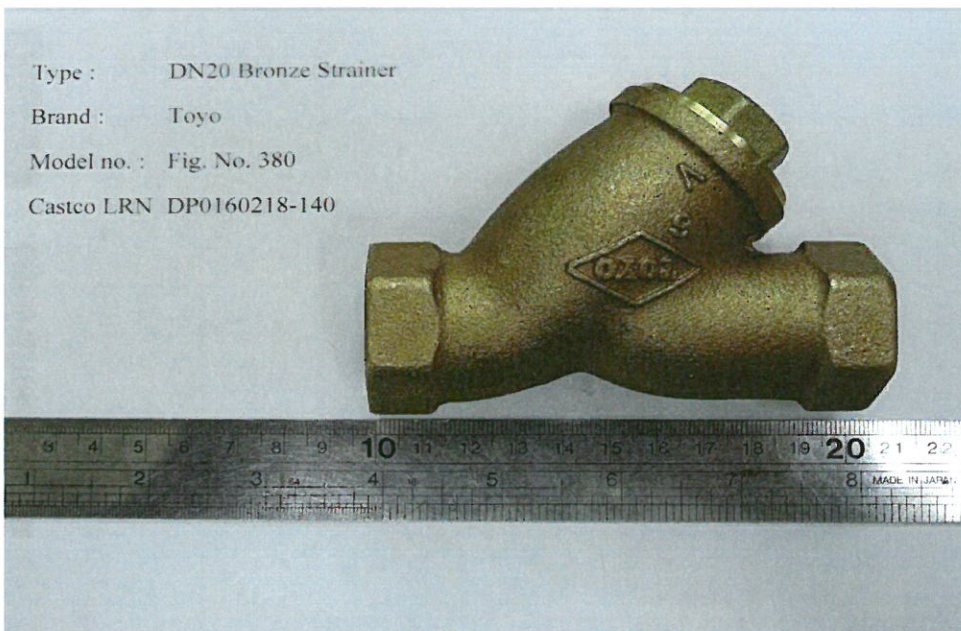
Date of issue : 22 April 2016  
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Castco LRN : DP0160218-138 DIM

Appendix B



DP0160218-140(1)



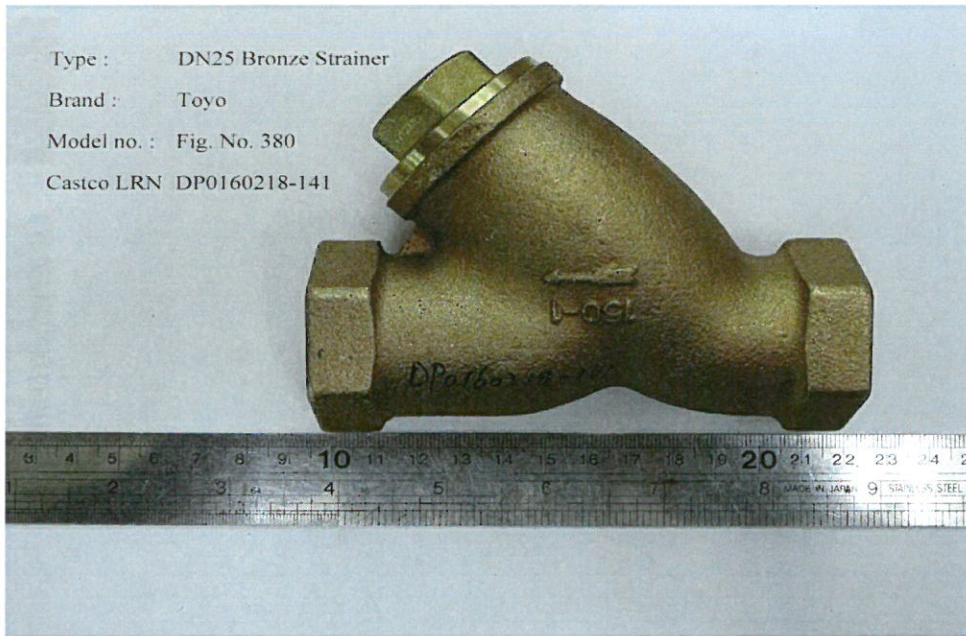
DP0160218-140(2)

Test Report  
Dimensions Check of Y-strainers  
(In-house method)

Date of issue : 22 April 2016  
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Castco LRN : DP0160218-138 DIM

Appendix C



DP0160218-141(1)



DP0160218-141(2)

Test Report  
Dimensions Check of Y-strainers  
(In-house method)

Date of issue : 22 April 2016  
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Castco LRN : DP0160218-138 DIM

Appendix D



DP0160218-142(1)



DP0160218-142(2)



Test Report  
Dimensions Check of Y-strainers  
(In-house method)

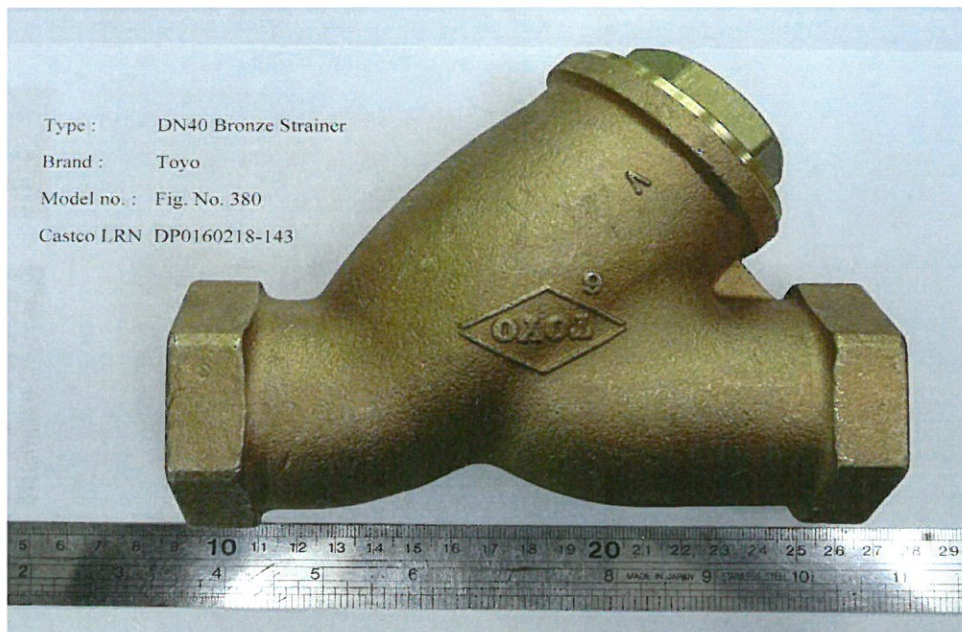
Date of issue : 22 April 2016  
Page 7 of 9 page(s)

Castco LRN : DP0160218-138 DIM

Appendix E



DP0160218-143(1)



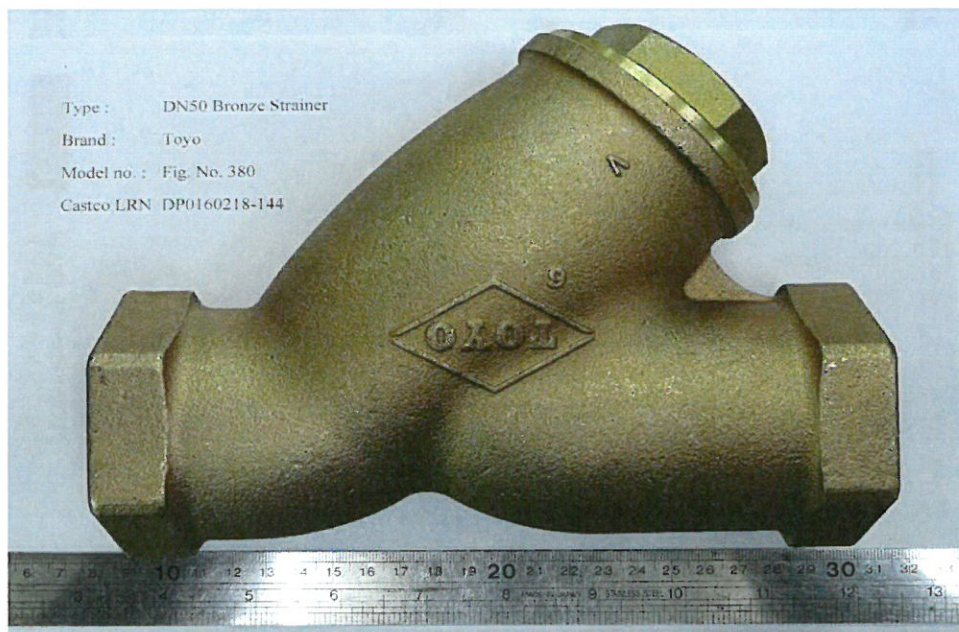
DP0160218-143(2)

Test Report  
Dimensions Check of Y-strainers  
(In-house method)

Date of issue : 22 April 2016

Page 8 of 9 page(s)

Castco LRN : DP0160218-138 DIM

Appendix FDP0160218-144(1)DP0160218-144(2)

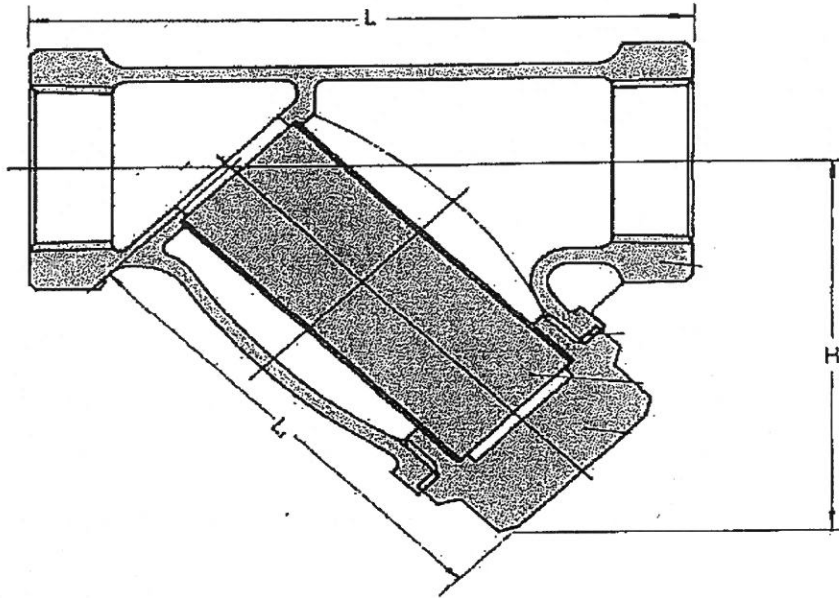
Test Report  
Dimensions Check of Y-strainers  
(In-house method)

Date of issue : 22 April 2016

Page 9 of 9 page(s)

Castco LRN : DP0160218-138 DIM

Appendix G



Dimensions Figure

**Test Report****Chemical Analysis of Copper and Copper Alloy**

Date of issue: 13-05-2016

Page 1 of 2

Castco LRN: MS0160421-31

**Details as supplied by customer**

Name of Customer : Gate Way Valve & Fitting Ltd.  
Address : Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong  
Job Title : "Toyo" Bronze Y-pattern Strainer - Fig. No.380  
Contract No. : --  
Customer's Ref. No. : --

**Sample details as supplied by customer**

Date of Sample Received : 21-04-2016  
Date Sampled : --  
Test Period : 10-05-2016  
Sample Description : DN15 Bronze Y-pattern Strainer with Thread Ends (Body)  
Specification : BS EN 1982:2008 Grade CC491K  
Specimen No.: DP0160218-139  
Manufacturer : Kitz (Thailand) Ltd.  
Model No.: Fig. No. 380 / Brand Name : Toyo / Origin: Thailand  
Body Marking : TOYO

**Test Method(s):-**

1) In House Method: ST-Multi-4 (Spark-OES)

**Remarks:**

I. Test results only relate to the specimen tested.

Checked by :

Cheng Chi Fai  
Senior Manager

Certified by:

LEE Stephen Shu Hang  
Ph.D.  
Technical Director

## Test Report

## Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Page 2 of 2

Castco LRN: MS0160421-31

| Chemical Analysis        |      | Result | Specification BS EN 1982:2008,<br>Table 23b, Grade CC491K<br>castings |
|--------------------------|------|--------|-----------------------------------------------------------------------|
| <sup>1)</sup> Aluminium  | Al % | <0.003 | 0.01 max.                                                             |
| <sup>1)</sup> Iron       | Fe % | 0.047  | 0.3 max.                                                              |
| <sup>1)</sup> Nickel     | Ni % | 0.20   | 2.0 max.                                                              |
| <sup>1)</sup> Phosphorus | P %  | 0.019  | 0.10 max.                                                             |
| <sup>1)</sup> Lead       | Pb % | 5.74   | 4.0 min.<br>6.0 max.                                                  |
| <sup>1)</sup> Sulphur    | S %  | 0.025  | 0.10 max.                                                             |
| <sup>1)</sup> Antimony   | Sb % | 0.053  | 0.25 max.                                                             |
| <sup>1)</sup> Silicon    | Si % | <0.002 | 0.01 max.                                                             |
| <sup>1)</sup> Tin        | Sn % | 4.76   | 4.0 min.<br>6.0 max.                                                  |
| <sup>1)</sup> Zinc       | Zn % | 5.40   | 4.0 min.<br>6.0 max.                                                  |
| <sup>1)</sup> Copper     | Cu % | 83.7   | 83.0 min.<br>87.0 max.                                                |

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

## End of Report

Form No.: CHM Cu&amp;Cu Alloy-3 T dd 03/02/2016

**Test Report****Chemical Analysis of Copper and Copper Alloy**

Date of issue: 13-05-2016  
Page 1 of 2

Castco LRN: MS0160421-32

**Details as supplied by customer**

Name of Customer : Gate Way Valve & Fitting Ltd.  
 Address : Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong  
 Job Title : "Toyo" Bronze Y-pattern Strainer - Fig. No.380  
 Contract No. : --  
 Customer's Ref. No. : --

**Sample details as supplied by customer**

Date of Sample Received : 21-04-2016  
 Date Sampled : --  
 Test Period : 28-04-2016 to 09-05-2016  
 Sample Description : DN15 Bronze Y-pattern Strainer with Thread Ends - Screen  
 Specification : BS EN 10088-1:2014, Grade 1.4301 (304)  
 Specimen No.: DP0160218-139  
 Manufacturer : Kitz (Thailand) Ltd.  
 Model No.: Fig. No. 380 / Brand Name : Toyo / Origin: Thailand  
 Body Marking : TOYO

**Test Method(s):-**

- 1) BS EN ISO 15350 : 2010
- 2) In House Method: ST-Multi-1(ICP-OES)
- 3) BS EN ISO 15351: 2010
- 4) In House Method: ST-Nb-1(ICP-OES)
- 5) In-house ST-CEV (By calculation)

**Remarks:**

- I. Test results only relate to the specimen tested.

Checked by :



Cheng Chi Fai  
Senior Manager

Approved Signatory:



LEE Stephen Shu Hang  
Ph.D.  
Technical Director

## Test Report

### Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016  
Page 2 of 2

Castco LRN: MS0160421-32

| Chemical Analysis                                                                                            | Result | Specification refer to<br>BSEN10088-2:2014, Table<br>1, Grade 1.4301 |              |
|--------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------|--------------|
| <sup>1)</sup> Total Carbon Content                                                                           | C %    | 0.064                                                                | 0.07 max.    |
| <sup>1)</sup> Total Sulfur Content                                                                           | S %    | 0.0039                                                               | 0.015 max.   |
| <sup>2)</sup> Chromium                                                                                       | Cr %   | 18.59                                                                | 17.5 to 19.5 |
| <sup>2)</sup> Copper                                                                                         | Cu %   | --                                                                   | --           |
| <sup>2)</sup> Manganese                                                                                      | Mn %   | 1.09                                                                 | 2.00 max.    |
| <sup>2)</sup> Molybdenum                                                                                     | Mo %   | --                                                                   | --           |
| <sup>2)</sup> Nickel                                                                                         | Ni %   | 8.15                                                                 | 8.0 to 10.5  |
| <sup>2)</sup> Phosphorus                                                                                     | P %    | 0.035                                                                | 0.045 max.   |
| <sup>2)</sup> Silicon                                                                                        | Si %   | 0.432                                                                | 1.00 max.    |
| <sup>2)</sup> Titanium                                                                                       | Ti %   | --                                                                   | --           |
| <sup>2)</sup> Vanadium                                                                                       | V %    | --                                                                   | --           |
| <sup>3)</sup> Nitrogen                                                                                       | N %    | 0.046                                                                | 0.10 max.    |
| <sup>4)</sup> Niobium                                                                                        | Nb %   | --                                                                   | --           |
| <sup>5)</sup> Carbon Equivalent Value $C_{eq} = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$ (%) |        | --                                                                   | --           |

#### Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 10088-2:2014, Table 1, Grade 1.4301.

#### End of Report

Form No.: CHM Steel-1 T dd 16/12/2015

**Test Report****Chemical Analysis of Copper and Copper Alloy**

Date of issue: 13-05-2016

Page 1 of 2

Castco LRN: MS0160421-33

**Details as supplied by customer**

Name of Customer : Gate Way Valve & Fitting Ltd.  
Address : Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong  
Job Title : "Toyo" Bronze Y-pattern Strainer - Fig. No.380  
Contract No. : --  
Customer's Ref. No. : --

**Sample details as supplied by customer**

Date of Sample Received : 21-04-2016  
Date Sampled : --  
Test Period : 10-05-2016  
Sample Description : DN32 Bronze Y-pattern Strainer with Thread Ends (Body)  
Specification : BS EN 1982:2008 Grade CC491K  
Specimen No.: DP0160218-142  
Manufacturer : Kitz (Thailand) Ltd.  
Model No.: Fig. No. 380 / Brand Name : Toyo / Origin: Thailand  
Body Marking : TOYO


**Test Method(s):-**

1) In House Method: ST-Multi-4 (Spark-OES)

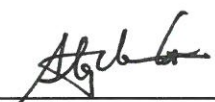
**Remarks:**

I. Test results only relate to the specimen tested.

Checked by :

  
Cheng Chi Fai  
Senior Manager

Certified by:

  
LEE Stephen Shu Hang  
Ph.D.  
Technical Director



**Test Report**

**Chemical Analysis of Copper and Copper Alloy**

Date of issue: 13-05-2016

Page 2 of 2

Castco LRN: MS0160421-33

| Chemical Analysis        |      | Result | Specification BS EN 1982:2008,<br>Table 23b, Grade CC491K<br>castings |
|--------------------------|------|--------|-----------------------------------------------------------------------|
| <sup>1)</sup> Aluminium  | Al % | <0.003 | 0.01 max.                                                             |
| <sup>1)</sup> Iron       | Fe % | 0.034  | 0.3 max.                                                              |
| <sup>1)</sup> Nickel     | Ni % | 0.20   | 2.0 max.                                                              |
| <sup>1)</sup> Phosphorus | P %  | 0.019  | 0.10 max.                                                             |
| <sup>1)</sup> Lead       | Pb % | 5.47   | 4.0 min.<br>6.0 max.                                                  |
| <sup>1)</sup> Sulphur    | S %  | 0.024  | 0.10 max.                                                             |
| <sup>1)</sup> Antimony   | Sb % | 0.032  | 0.25 max.                                                             |
| <sup>1)</sup> Silicon    | Si % | <0.002 | 0.01 max.                                                             |
| <sup>1)</sup> Tin        | Sn % | 4.63   | 4.0 min.<br>6.0 max.                                                  |
| <sup>1)</sup> Zinc       | Zn % | 5.39   | 4.0 min.<br>6.0 max.                                                  |
| <sup>1)</sup> Copper     | Cu % | 84.2   | 83.0 min.<br>87.0 max.                                                |

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

**End of Report**

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

**Test Report****Chemical Analysis of Copper and Copper Alloy**Date of issue: 13-05-2016  
Page 1 of 2

Castco LRN: MS0160421-34

**Details as supplied by customer**

Name of Customer : Gate Way Valve & Fitting Ltd.

Address : Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : "Toyo" Bronze Y-pattern Strainer - Fig. No.380

Contract No. : --

Customer's Ref. No. : --

**Sample details as supplied by customer**

Date of Sample Received : 21-04-2016

Date Sampled : --

Test Period : 28-04-2016 to 09-05-2016

Sample Description : DN32 Bronze Y-pattern Strainer with Thread Ends - Screen

Specification : BS EN 10088-1:2014, Grade 1.4301 (304)

Specimen No.: DP0160218-142

Manufacturer : Kitz (Thailand) Ltd.

Model No.: Fig. No. 380 / Brand Name : Toyo / Origin: Thailand

Body Marking : TOYO

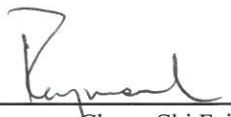
**Test Method(s):-**

- 1) BS EN ISO 15350 : 2010
- 2) In House Method: ST-Multi-1(ICP-OES)
- 3) BS EN ISO 15351: 2010
- 4) In House Method: ST-Nb-1(ICP-OES)
- 5) In-house ST-CEV (By calculation)

**Remarks:**

- I. Test results only relate to the specimen tested.

Checked by :

Cheng Chi Fai  
Senior Manager

Approved Signatory:

LEE Stephen Shu Hang  
Ph.D.  
Technical Director

## Test Report

### Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016  
Page 2 of 2

Castco LRN: MS0160421-34

| Chemical Analysis                                                                                                  | Result | Specification refer to<br>BSEN10088-2:2014, Table<br>1, Grade 1.4301 |
|--------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------|
| <sup>1)</sup> Total Carbon Content C %                                                                             | 0.064  | 0.07 max.                                                            |
| <sup>1)</sup> Total Sulfur Content S %                                                                             | 0.0031 | 0.015 max.                                                           |
| <sup>2)</sup> Chromium Cr %                                                                                        | 18.30  | 17.5 to 19.5                                                         |
| <sup>2)</sup> Copper Cu %                                                                                          | --     | --                                                                   |
| <sup>2)</sup> Manganese Mn %                                                                                       | 1.06   | 2.00 max.                                                            |
| <sup>2)</sup> Molybdenum Mo %                                                                                      | --     | --                                                                   |
| <sup>2)</sup> Nickel Ni %                                                                                          | 8.16   | 8.0 to 10.5                                                          |
| <sup>2)</sup> Phosphorus P %                                                                                       | 0.031  | 0.045 max.                                                           |
| <sup>2)</sup> Silicon Si %                                                                                         | 0.419  | 1.00 max.                                                            |
| <sup>2)</sup> Titanium Ti %                                                                                        | --     | --                                                                   |
| <sup>2)</sup> Vanadium V %                                                                                         | --     | --                                                                   |
| <sup>3)</sup> Nitrogen N %                                                                                         | 0.042  | 0.10 max.                                                            |
| <sup>4)</sup> Niobium Nb %                                                                                         | --     | --                                                                   |
| <sup>5)</sup> Carbon Equivalent Value $C_{eq} = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$ (%) | --     | --                                                                   |

#### Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 10088-2:2014, Table 1, Grade 1.4301.

#### End of Report

Form No.: CHM Steel-1 T dd 16/12/2015

**Test Report****Chemical Analysis of Copper and Copper Alloy**

Date of issue: 13-05-2016

Page 1 of 2

Castco LRN: MS0160421-35

**Details as supplied by customer**

Name of Customer : Gate Way Valve & Fitting Ltd.  
Address : Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong  
Job Title : "Toyo" Bronze Y-pattern Strainer - Fig. No.380  
Contract No. : --  
Customer's Ref. No. : --

**Sample details as supplied by customer**

Date of Sample Received : 21-04-2016  
Date Sampled : --  
Test Period : 10-05-2016  
Sample Description : DN50 Bronze Y-pattern Strainer with Thread Ends (Body)  
Specification : BS EN 1982:2008 Grade CC491K  
Specimen No.: DP0160218-144  
Manufacturer : Kitz (Thailand) Ltd.  
Model No.: Fig. No. 380 / Brand Name : Toyo / Origin: Thailand  
Body Marking : TOYO

**Test Method(s):-**

1) In House Method: ST-Multi-4 (Spark-OES)


**Remarks:**

I. Test results only relate to the specimen tested.

Checked by :

  
Cheng Chi Fai  
Senior Manager

Certified by:

  
LEE Stephen Shu Hang  
Ph.D.  
Technical Director

**Test Report**

**Chemical Analysis of Copper and Copper Alloy**

Date of issue: 13-05-2016

Page 2 of 2

Castco LRN: MS0160421-35

| Chemical Analysis |      | Result | Specification BS EN 1982:2008,<br>Table 23b, Grade CC491K<br>castings |
|-------------------|------|--------|-----------------------------------------------------------------------|
| 1) Aluminium      | Al % | <0.003 | 0.01 max.                                                             |
| 1) Iron           | Fe % | 0.036  | 0.3 max.                                                              |
| 1) Nickel         | Ni % | 0.20   | 2.0 max.                                                              |
| 1) Phosphorus     | P %  | 0.019  | 0.10 max.                                                             |
| 1) Lead           | Pb % | 4.83   | 4.0 min.<br>6.0 max.                                                  |
| 1) Sulphur        | S %  | 0.023  | 0.10 max.                                                             |
| 1) Antimony       | Sb % | 0.032  | 0.25 max.                                                             |
| 1) Silicon        | Si % | <0.002 | 0.01 max.                                                             |
| 1) Tin            | Sn % | 4.56   | 4.0 min.<br>6.0 max.                                                  |
| 1) Zinc           | Zn % | 5.32   | 4.0 min.<br>6.0 max.                                                  |
| 1) Copper         | Cu % | 85.0   | 83.0 min.<br>87.0 max.                                                |

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

**End of Report**

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

**Test Report****Chemical Analysis of Copper and Copper Alloy**Date of issue: 13-05-2016  
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Castco LRN: MS0160421-36

**Details as supplied by customer**

Name of Customer : Gate Way Valve & Fitting Ltd.  
Address : Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong  
Job Title : "Toyo" Bronze Y-pattern Strainer - Fig. No.380  
Contract No. : --  
Customer's Ref. No. : --

**Sample details as supplied by customer**

Date of Sample Received : 21-04-2016  
Date Sampled : --  
Test Period : 28-04-2016 to 09-05-2016  
Sample Description : DN50 Bronze Y-pattern Strainer with Thread Ends - Screen  
Specification : BS EN 10088-1:2014, Grade 1.4301 (304)  
Specimen No.: DP0160218-144  
Manufacturer : Kitz (Thailand) Ltd.  
Model No.: Fig. No. 380 / Brand Name : Toyo / Origin: Thailand  
Body Marking : TOYO

**Test Method(s):-**

- 1) BS EN ISO 15350 : 2010
- 2) In House Method: ST-Multi-1(ICP-OES)
- 3) BS EN ISO 15351: 2010
- 4) In House Method: ST-Nb-1(ICP-OES)
- 5) In-house ST-CEV (By calculation)

**Remarks:**

I. Test results only relate to the specimen tested.

Checked by :

  
Cheng Chi Fai  
Senior Manager

Approved Signatory:

  
LEE Stephen Shu Hang  
Ph.D.  
Technical Director

## Test Report

### Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016  
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Castco LRN: MS0160421-36

| Chemical Analysis                                                                                 | Result | Specification refer to<br>BSEN10088-2:2014, Table<br>1, Grade 1.4301 |
|---------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------|
| 1) Total Carbon Content C %                                                                       | 0.058  | 0.07 max.                                                            |
| 1) Total Sulfur Content S %                                                                       | 0.0032 | 0.015 max.                                                           |
| 2) Chromium Cr %                                                                                  | 18.29  | 17.5 to 19.5                                                         |
| 2) Copper Cu %                                                                                    | --     | --                                                                   |
| 2) Manganese Mn %                                                                                 | 1.06   | 2.00 max.                                                            |
| 2) Molybdenum Mo %                                                                                | --     | --                                                                   |
| 2) Nickel Ni %                                                                                    | 8.14   | 8.0 to 10.5                                                          |
| 2) Phosphorus P %                                                                                 | 0.032  | 0.045 max.                                                           |
| 2) Silicon Si %                                                                                   | 0.421  | 1.00 max.                                                            |
| 2) Titanium Ti %                                                                                  | --     | --                                                                   |
| 2) Vanadium V %                                                                                   | --     | --                                                                   |
| 3) Nitrogen N %                                                                                   | 0.045  | 0.10 max.                                                            |
| 4) Niobium Nb %                                                                                   | --     | --                                                                   |
| 5) Carbon Equivalent Value $C_{eq} = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$ (%) | --     | --                                                                   |

#### Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 10088-2:2014, Table 1, Grade 1.4301.

#### End of Report

Form No.: CHM Steel-1 T dd 16/12/2015